

# Exhibit 7

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IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF OHIO  
EASTERN DIVISION

- - -

IN RE: NATIONAL : HON. DAN A.  
PRESCRIPTION OPIATE : POLSTER  
LITIGATION :  
:  
APPLIES TO ALL CASES : NO.  
: 1:17-MD-2804  
:

- HIGHLY CONFIDENTIAL -

SUBJECT TO FURTHER CONFIDENTIALITY REVIEW

- - -

April 29, 2019

- - -

Videotaped deposition of  
KATHERINE KEYES, Ph.D., taken pursuant to  
notice, was held at the law offices of  
Lieff Cabraser, LLP, 250 Hudson Street,  
New York, New York beginning at 9:08  
a.m., on the above date, before Michelle  
L. Gray, a Registered Professional  
Reporter, Certified Shorthand Reporter,  
Certified Realtime Reporter, and Notary  
Public.

- - -

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<p style="text-align: right;">Page 46</p> <p>1 THE WITNESS: I have not.</p> <p>2 No, I have -- I'm sure there's</p> <p>3 many, many depositions. I have</p> <p>4 not asked for all the depositions.</p> <p>5 BY MR. HERMAN:</p> <p>6 Q. These are ones that were</p> <p>7 selected to you by plaintiffs' counsel?</p> <p>8 A. These were materials that</p> <p>9 were provided to me because they were</p> <p>10 germane to the -- to the topic.</p> <p>11 Q. They were provided to you by</p> <p>12 plaintiff's counsel?</p> <p>13 A. Yes.</p> <p>14 Q. And did you have any input</p> <p>15 into what depositions the plaintiff's</p> <p>16 counsel decided to provide you?</p> <p>17 MS. RELKIN: Objection to</p> <p>18 form.</p> <p>19 THE WITNESS: There was no</p> <p>20 discussion of the broader range of</p> <p>21 the universe of depositions. So</p> <p>22 these were particular depositions</p> <p>23 that they thought would be useful</p> <p>24 in allowing me to understand what</p>	<p style="text-align: right;">Page 48</p> <p>1 more useful than others.</p> <p>2 BY MR. HERMAN:</p> <p>3 Q. Did anyone point you to</p> <p>4 specific portions of the depositions?</p> <p>5 A. No.</p> <p>6 Q. Okay. And then you've got,</p> <p>7 on the next page, a list of 20 documents</p> <p>8 produced in the litigation.</p> <p>9 A. Mm-hmm.</p> <p>10 Q. Do you know how many</p> <p>11 documents have been produced in the</p> <p>12 litigation?</p> <p>13 A. No.</p> <p>14 Q. How did you figure out what</p> <p>15 documents to look at?</p> <p>16 MS. RELKIN: Objection to</p> <p>17 form.</p> <p>18 THE WITNESS: These were the</p> <p>19 list of documents that were made</p> <p>20 available to me.</p> <p>21 BY MR. HERMAN:</p> <p>22 Q. And when you say made</p> <p>23 available to you, do you mean provided to</p> <p>24 you by plaintiffs' counsel?</p>
<p style="text-align: right;">Page 47</p> <p>1 was going on at the county level.</p> <p>2 BY MR. HERMAN:</p> <p>3 Q. Did you read each of these</p> <p>4 five depositions in its entirety?</p> <p>5 A. I reviewed them. You know,</p> <p>6 to say I read them, you know, I reviewed</p> <p>7 them to the extent that they were useful</p> <p>8 in formulating an understanding of what</p> <p>9 was going on in the counties.</p> <p>10 Q. Did you -- did you read them</p> <p>11 in their entirety?</p> <p>12 MS. RELKIN: Objection to</p> <p>13 form.</p> <p>14 THE WITNESS: For the</p> <p>15 most -- I read them. I don't --</p> <p>16 yeah. The majority of them I</p> <p>17 looked at, I saw whether they were</p> <p>18 useful in formulating my</p> <p>19 understanding of what was</p> <p>20 happening in the counties. Some</p> <p>21 were more useful than others. I</p> <p>22 wouldn't say that I read every</p> <p>23 single one cover to cover in its</p> <p>24 entirety because some I think were</p>	<p style="text-align: right;">Page 49</p> <p>1 A. Yes.</p> <p>2 Q. Are you aware that none of</p> <p>3 the documents on this list were</p> <p>4 provided -- were produced by defendants</p> <p>5 in this case?</p> <p>6 A. Am I -- sorry say that</p> <p>7 again.</p> <p>8 Q. Are you aware none of the</p> <p>9 documents on this list were produced by</p> <p>10 defendants in this case?</p> <p>11 A. I was not privy to the</p> <p>12 source, the -- which documents were</p> <p>13 produced by whom.</p> <p>14 Q. Did you conduct any</p> <p>15 interviews before preparing your report?</p> <p>16 A. Interviews?</p> <p>17 Q. Interviews of, for example,</p> <p>18 individuals who work for Cuyahoga County?</p> <p>19 A. No.</p> <p>20 Q. Did you -- you didn't</p> <p>21 conduct any interviews?</p> <p>22 A. I did not conduct</p> <p>23 interviews.</p> <p>24 Q. Okay. Did you ask to?</p>

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<p style="text-align: right;">Page 50</p> <p>1 A. You know, I'm an 2 epidemiologist. I study population 3 aggregate data. I don't -- that's not 4 within the scope of what this report 5 entails. 6 Q. So the answer is that you 7 didn't ask to speak to anyone? 8 A. The answer is that, as an 9 epidemiologist, you know, I don't do 10 interviews with individuals. I study 11 population level trends. 12 MR. HERMAN: Can I have the 13 supplemental list. 14 (Document marked for 15 identification as Exhibit 16 Keyes-2.) 17 BY MR. HERMAN: 18 Q. I'm handing you what's been 19 marked as Exhibit 2, which is a 20 supplemental list of materials that was 21 provided to us by plaintiffs' counsel. I 22 believe on April 23rd, 2019. 23 And, Professor Keyes, a few 24 times you've referenced additional</p>	<p style="text-align: right;">Page 52</p> <p>1 submitted. 2 Q. Is there any reason that you 3 didn't review these depositions before 4 submitting your report? 5 A. Is there -- what do you mean 6 by reason? 7 Q. Well, they're all -- they're 8 all dated prior to the submission of your 9 report, correct? 10 A. Yes. 11 Q. And so they were available 12 to you at the time that you submitted 13 your report? 14 MS. RELKIN: Objection to 15 form. 16 THE WITNESS: Yes. You 17 know, my report is on the 18 epidemiological evidence. I 19 mostly relied on the peer-reviewed 20 literature and the grey literature 21 that I cite in the report. I 22 didn't rely on transcripts. 23 BY MR. HERMAN: 24 Q. And then there are two New</p>
<p style="text-align: right;">Page 51</p> <p>1 materials that you reviewed after 2 preparing your report. Is this a 3 complete list of the materials? 4 A. To my knowledge, yes. 5 Q. And I think you said that 6 the transcripts that were reviewed on -- 7 that are listed here were provided to you 8 by plaintiffs' counsel? 9 A. I'm sorry. Say that -- the 10 transcripts that were -- 11 Q. The five deposition 12 transcripts that are listed on the 13 supplemental materials considered list. 14 A. The four? I think it's 15 four. 16 Q. I apologize. Four. The 17 four deposition transcripts were provided 18 to you by plaintiffs' counsel? 19 A. Yes. 20 Q. When did you prepare your 21 report? 22 A. I began preparing it around 23 January of 2019. And worked on it 24 through around March when it was</p>	<p style="text-align: right;">Page 53</p> <p>1 England Journal medical -- of Medicine 2 articles? 3 A. Mm-hmm. 4 Q. And how did you locate those 5 articles? 6 A. I'm an avid reader of the 7 scientific literature. And so as a 8 scientist, I regularly read the journals. 9 Q. And so you just found them 10 after you submitted your report while you 11 were reading The New England Journal of 12 Medicine? 13 MS. RELKIN: Objection. 14 THE WITNESS: I regularly 15 read The New England Journal of 16 Medicine. I think these came up 17 in my -- in my -- the regular 18 course of my scientific practice. 19 BY MR. HERMAN: 20 Q. Okay. What role, if any, 21 did the materials listed on your 22 supplemental list play in formulating 23 your opinions in this case? 24 A. These materials didn't</p>

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<p>1 just before you move on,  2 Exhibit 15 has some highlighting  3 in it. Is there any significance  4 to that?  5 MS. WINNER: I have no idea.  6 MS. DO AMARAL: Okay. Just  7 checking. It's just not something  8 that we discussed.  9 MS. WINNER: No, we did not.  10 And it --  11 MS. DO AMARAL: No problem.  12 MS. WINNER: Thank you.  13 BY MS. WINNER:  14 Q. First sentence of C.4.3 in  15 your report says that an estimated  16 442,995 children were in the foster care  17 system in the U.S. as of 2017. And of  18 the 269,690 who entered the system in  19 2017, 39.3 percent of those cases were  20 due to parental substance abuse disorder.  21 And then you cite Reference 171.  22 A. Yes.  23 Q. And is that --  24 MS. WINNER: What exhibit</p>	<p>1 Q. Turn to Page 36 where you  2 provide specific discussion of Cuyahoga  3 and Summit Counties in Section F.4.4.  4 Do you see that?  5 A. Yes.  6 Q. And you provide a statistics  7 in the first sentence for Cuyahoga  8 County. You then again -- you again  9 refer to Reference 171.  10 Do you see that?  11 A. I do see that.  12 Q. And can you tell me where  13 the Cuyahoga County numbers are in  14 Exhibit 171 -- in Reference 171,  15 Exhibit 16?  16 A. That might be a typo. And  17 we can provide you with an updated  18 reference. I would have to go back and  19 look at the footnotes. I mean, it's not  20 in what you provided to me here.  21 Q. And if you look at the first  22 sentence on the paragraph, next paragraph  23 on Summit County. It again -- it  24 provides a number for Summit County, and</p>
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<p>1 number is this?  2 BY MS. WINNER:  3 Q. Is that Exhibit 16? Is that  4 the reference --  5 A. Exhibit 16 is Reference 171.  6 Q. Okay. And can you tell me  7 where that 39.3 percent figure is to be  8 found in this exhibit?  9 A. So if you look at the second  10 page -- oh, wait. So this is entering  11 the Foster care system as of 2017. So in  12 2017, drug abuse of the parent was  13 36 percent of the circumstances for the  14 child's removal. 2 percent was the drug  15 abuse of the child. Oh, but I have here  16 parental.  17 Q. Yes.  18 A. My apologies. And is 2016  19 here as well? I can provide you with an  20 updated citation that would include 2016.  21 I'm assuming that I averaged the two.  22 But --  23 Q. All right. If you would --  24 A. -- 36 is, you know, close.</p>	<p>1 again cites the same reference, correct?  2 A. We can provide you with an  3 updated citation, because I agree with  4 you it's not here.  5 Q. Okay.  6 A. We were able to provide  7 those numbers, so we can update that.  8 Q. On your opinions -- again,  9 I'm running out of time. Let me just ask  10 this real fast, about -- you also provide  11 some numbers about naloxone needs and  12 fentanyl test strips.  13 My single question about  14 both of those is, am I correct that,  15 again, you're only attempting to identify  16 needs and not evaluating what is  17 currently available in the counties for  18 these things?  19 A. So in neither section do  20 I -- I don't think I spoke to the current  21 availabilities in the counties. It was  22 really an assessment of the public health  23 need in the counties.  24 MS. WINNER: Let's go off</p>

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<p>1 the record.</p> <p>2 THE VIDEOGRAPHER: All</p> <p>3 right. The time is 5:18 p.m. Off</p> <p>4 the record.</p> <p>5 (Short break.)</p> <p>6 THE VIDEOGRAPHER: The time</p> <p>7 is 5:22 p.m. Back on the record.</p> <p>8 - - -</p> <p>9 EXAMINATION</p> <p>10 - - -</p> <p>11 BY MR. O'CONNOR:</p> <p>12 Q. Professor Keyes, I'm Andrew</p> <p>13 O'Connor, I represent one of the</p> <p>14 manufacturers in the case. I'm going to</p> <p>15 be asking you some questions on their</p> <p>16 behalf.</p> <p>17 In connection with preparing</p> <p>18 your report, did you review any marketing</p> <p>19 material used by opioid manufacturers?</p> <p>20 A. So, I reviewed what is cited</p> <p>21 in my report. This includes a number of</p> <p>22 different papers in the peer-reviewed</p> <p>23 literature that go over the marketing</p> <p>24 materials from --</p>	<p>1 Q. For that point?</p> <p>2 A. I'm -- I'm not -- I just --</p> <p>3 I'm sorry, I just want to understand the</p> <p>4 question. Am I relying on any other</p> <p>5 peer-reviewed materials for which --</p> <p>6 which point specifically?</p> <p>7 Q. For -- for any opinion on</p> <p>8 marketing use -- marketing materials used</p> <p>9 by opioid manufacturers.</p> <p>10 A. I'm relying on the material</p> <p>11 the -- to form the opinions, the material</p> <p>12 that I relied on is the material that is</p> <p>13 cited in this report.</p> <p>14 Q. Okay. So just to be clear,</p> <p>15 did you review any of the actual primary</p> <p>16 source material, which is to say, the</p> <p>17 material -- the marketing materials</p> <p>18 themselves in writing your report?</p> <p>19 A. So the --</p> <p>20 MS. RELKIN: Objection to</p> <p>21 form.</p> <p>22 THE WITNESS: -- material</p> <p>23 that I relied on to write my</p> <p>24 report included a broad range of</p>
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<p>1 Q. Other than what you've cited</p> <p>2 in the report, did you review any</p> <p>3 marketing materials or studies --</p> <p>4 A. Everything that I reviewed</p> <p>5 has been provided. I'm familiar, as part</p> <p>6 of my expertise in opioid use disorders,</p> <p>7 more broadly with marketing materials</p> <p>8 that were used.</p> <p>9 Q. And what marketing materials</p> <p>10 are you familiar with through that</p> <p>11 experience?</p> <p>12 A. The only market -- the only</p> <p>13 materials that I cite in the report that</p> <p>14 I rely on for the opinions that I made,</p> <p>15 are the materials that are evaluated in</p> <p>16 the peer-reviewed literature, that</p> <p>17 overview the -- the evidence that was</p> <p>18 used to market prescription --</p> <p>19 Q. Are you relying on any other</p> <p>20 peer-reviewed materials other than what</p> <p>21 you've cited in the report?</p> <p>22 MS. RELKIN: For that</p> <p>23 opinion?</p> <p>24 BY MR. O'CONNOR:</p>	<p>1 peer-reviewed literature, articles</p> <p>2 that evaluate evidence that was</p> <p>3 used in marketing materials.</p> <p>4 More broadly, given 15 years</p> <p>5 of studying opioid use disorders,</p> <p>6 I'm familiar with marketing</p> <p>7 materials that were used. There</p> <p>8 was no marketing material that I</p> <p>9 relied on to form the opinion that</p> <p>10 is in this report.</p> <p>11 BY MR. O'CONNOR:</p> <p>12 Q. In 15 years what marketing</p> <p>13 materials related to pharmaceutical</p> <p>14 opioids did you review?</p> <p>15 A. There has been voluminous</p> <p>16 evidence, as I cite here, regarding</p> <p>17 distribution, sales and marketing of</p> <p>18 opioids.</p> <p>19 Q. Does any of the evidence</p> <p>20 you're referring to relate to any</p> <p>21 manufacturing defendants in this case?</p> <p>22 MS. RELKIN: Objection to</p> <p>23 form.</p> <p>24 You mean specific? Is that</p>

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<p>1 what you said?</p> <p>2 THE WITNESS: Does any of</p> <p>3 the evidence that I'm referring to</p> <p>4 relate to any manufacturing -- I</p> <p>5 think the evidence that I've</p> <p>6 provided in this report relates to</p> <p>7 manufacturers of opioids.</p> <p>8 BY MR. O'CONNOR:</p> <p>9 Q. Professor Keyes, who are the</p> <p>10 manufacturing defendants in this case?</p> <p>11 A. There's a broad range of</p> <p>12 manufacturing defendants in the case.</p> <p>13 You know, I'm not -- I know that Purdue,</p> <p>14 Janssen, Teva, a number of other</p> <p>15 manufacturers are involved.</p> <p>16 Q. Can you name any other</p> <p>17 manufacturers as you sit here today?</p> <p>18 A. I would have to go back to</p> <p>19 my materials. You know, I think it's all</p> <p>20 cited in the complaint. The -- the</p> <p>21 opinions that I derived at for this</p> <p>22 report are not specific to any particular</p> <p>23 manufacturer unless I cite a specific</p> <p>24 product in the report. So all of the</p>	<p>1 Do you know who Art Van Zee</p> <p>2 is?</p> <p>3 A. Sorry, I'm just trying to</p> <p>4 find the specific place I reference that.</p> <p>5 Do you know what page it's on?</p> <p>6 So I -- the use of that</p> <p>7 article is for the statement, "From 1997</p> <p>8 to 2002, prescriptions for OxyContin for</p> <p>9 noncancer pain increased from</p> <p>10 approximately 670,000 in 1997 to" -- "to</p> <p>11 about 6.2 million in 2002. Prescriptions</p> <p>12 for cancer pain also increased about</p> <p>13 fourfold across the same period."</p> <p>14 Q. Back to my question. Do you</p> <p>15 know who Art Van Zee is?</p> <p>16 A. Do I know him personally?</p> <p>17 Q. Do you know who -- who he is</p> <p>18 generally?</p> <p>19 A. According to the article, he</p> <p>20 is an M.D., and he is affiliated with</p> <p>21 Stone Mountain Health Services.</p> <p>22 Q. Other than what you're</p> <p>23 reading right now, are you familiar with</p> <p>24 his credentials?</p>
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<p>1 opinions that I've arrived at are about</p> <p>2 the overall emergence of an opioid</p> <p>3 epidemic in the United States.</p> <p>4 Q. In connection with Purdue,</p> <p>5 did you review any Purdue marketing</p> <p>6 materials yourself?</p> <p>7 A. In connection with Purdue?</p> <p>8 So what I've cited -- I -- I think I've</p> <p>9 answered the question. What I've cited</p> <p>10 in the -- in the report is the</p> <p>11 peer-reviewed literature that evaluates</p> <p>12 the evidence that was used for marketing</p> <p>13 materials.</p> <p>14 Q. I'm going to mark an exhibit</p> <p>15 that you cite in your report.</p> <p>16 (Document marked for</p> <p>17 identification as Exhibit</p> <p>18 Keyes-17.)</p> <p>19 BY MR. O'CONNOR:</p> <p>20 Q. It's a study by Art Van Zee.</p> <p>21 It's marked Exhibit 17.</p> <p>22 A. Can you tell me which</p> <p>23 citation number it is in the report?</p> <p>24 Q. I believe it's 15.</p>	<p>1 A. I'm not aware of other</p> <p>2 articles by Art Van Zee that I relied on</p> <p>3 for the opinions in this report.</p> <p>4 Q. To your knowledge, is he an</p> <p>5 epidemiologist?</p> <p>6 A. I have not evaluated his</p> <p>7 training.</p> <p>8 Q. Does he have any expertise</p> <p>9 related to the marketing of prescription</p> <p>10 opioids?</p> <p>11 MS. RELKIN: Objection.</p> <p>12 THE WITNESS: That's not</p> <p>13 information that was -- I think</p> <p>14 the statement in the -- where I</p> <p>15 cite his work is based on what is</p> <p>16 written here. I don't think it --</p> <p>17 I'm sorry, your question</p> <p>18 was: Do I have any knowledge of</p> <p>19 his expertise related to the</p> <p>20 marketing of prescription opioids?</p> <p>21 I'm not sure how that relates to</p> <p>22 the statement that "OxyContin for</p> <p>23 noncancer pain increased from</p> <p>24 approximately 670,000 to</p>

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<p>1 statements.</p> <p>2 MS. RELKIN: Objection to</p> <p>3 form.</p> <p>4 BY MR. O'CONNOR:</p> <p>5 Q. What I'm asking is simply,</p> <p>6 direct me to the part of the report that</p> <p>7 provides support for the statement that</p> <p>8 opioid marketing materials understated</p> <p>9 the risks of opioids.</p> <p>10 A. So I would say that there's</p> <p>11 two different sections that evaluate that</p> <p>12 statement. One is Section B.2. And in</p> <p>13 section B.2, I provide an overview of a</p> <p>14 number of different studies that have</p> <p>15 estimated opioid use disorder and related</p> <p>16 consequences among medical users of</p> <p>17 opioids.</p> <p>18 And then in several other</p> <p>19 sections of the report, I also cite the</p> <p>20 peer-reviewed literature on the</p> <p>21 association between the marketing of</p> <p>22 opioid products with risk.</p> <p>23 Q. Okay. I'd like to direct</p> <p>24 your attention to Page 11 of your report,</p>	<p>1 (Document marked for</p> <p>2 identification as Exhibit</p> <p>3 Keyes-19.)</p> <p>4 BY MR. O'CONNOR:</p> <p>5 Q. Here. I've marked it as</p> <p>6 Exhibit 19.</p> <p>7 A. Okay. So this is a study --</p> <p>8 this is a review study. It looks at the</p> <p>9 interaction between physicians and</p> <p>10 pharmaceutical industry, including sales</p> <p>11 representatives, on their impact on</p> <p>12 physicians attitudes and prescribing</p> <p>13 habits.</p> <p>14 Q. Okay. And you cited this</p> <p>15 study in connection with your statement</p> <p>16 on Page 11?</p> <p>17 A. Yes.</p> <p>18 Q. I'll direct your attention</p> <p>19 to the second line of the second column.</p> <p>20 It says, "However, the evidence</p> <p>21 determining whether pharmaceutical</p> <p>22 industry and PSRs'," which here means</p> <p>23 pharmaceutical sales representatives,</p> <p>24 "interaction influence physicians is</p>
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<p>1 which we were just looking at a moment</p> <p>2 ago.</p> <p>3 You state that evidence</p> <p>4 shows that pharmaceutical marketing of</p> <p>5 prescription drugs increases prescribers'</p> <p>6 likelihood of prescribing the marketed</p> <p>7 drug in the future.</p> <p>8 A. I just need to find that</p> <p>9 section.</p> <p>10 Q. It's near the top. The last</p> <p>11 sentence --</p> <p>12 A. "Evidence shows that</p> <p>13 pharmaceutical marketing of prescription</p> <p>14 drugs increases the prescribers</p> <p>15 likelihood of prescribing."</p> <p>16 Q. And you cite Sources 16 and</p> <p>17 17.</p> <p>18 And 16 is a study by</p> <p>19 Dr. Fickweiler. Did I get that right?</p> <p>20 A. Yes.</p> <p>21 Q. Did you read the study by</p> <p>22 Dr. Fickweiler before you cited it?</p> <p>23 A. I'm just going to pull the</p> <p>24 study out.</p>	<p>1 divided and contradictory."</p> <p>2 Do you agree that the</p> <p>3 evidence determining whether</p> <p>4 pharmaceutical industry interactions</p> <p>5 influence physicians, is, quote, "divided</p> <p>6 and contradictory"?</p> <p>7 MS. RELKIN: Objection to</p> <p>8 form.</p> <p>9 THE WITNESS: Again, this is</p> <p>10 an introduction of a scientific</p> <p>11 paper. The purpose of an</p> <p>12 introduction is to set up what's</p> <p>13 known, not known, and the gaps in</p> <p>14 the literature.</p> <p>15 So that's not the conclusion</p> <p>16 or the results of this analysis.</p> <p>17 So I cited it in the paper, in my</p> <p>18 report, based on its results, and</p> <p>19 not for a statement in the</p> <p>20 introduction that's setting up why</p> <p>21 the study was conducted.</p> <p>22 BY MR. O'CONNOR:</p> <p>23 Q. So would you agree that as</p> <p>24 of the writing of this introduction that</p>

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<p>1 the evidence determining whether 2 pharmaceutical industry interactions 3 influence physicians was divided and 4 contradictory?</p> <p>5 A. I would need to look at the 6 specific citation, 17, 18, 19 through 22 7 and 23 through 26 to make a designation 8 about whether or not I agree with that 9 particular characterization. It's 10 typically -- it's typical in the 11 scientific literature that we set up what 12 the gaps in the literature are. And so 13 these studies would need to be looked at 14 one by one.</p> <p>15 Q. Did this -- did this study 16 by Dr. Fickweiler resolve any divided and 17 contradictory evidence on this question?</p> <p>18 MS. RELKIN: Objection to 19 form.</p> <p>20 THE WITNESS: So I believe 21 it's cited both this study and 22 another study with respect to that 23 statement. I'm sorry. I can't 24 find it.</p>	<p>1 according to the introduction, it was 2 still unclear whether marketing of 3 opioids influenced prescribing, correct?</p> <p>4 MS. RELKIN: Objection to 5 form.</p> <p>6 THE WITNESS: I -- I feel 7 that I've answered the question. 8 This is a -- what's standardly 9 done in introduction to scientific 10 papers is a setup of the actual 11 results that were going to be 12 presented in the papers. In order 13 to determine what the actual 14 strength of the evidence is for 15 pharmaceutical marketing of 16 opioids and whether it influenced 17 prescribing, we would need to go 18 into each one of these studies. I 19 wouldn't -- I don't think you can 20 make a generalization about what's 21 known in the world or to whom, 22 based on one sentence in an 23 introduction section.</p> <p>24 BY MR. O'CONNOR:</p>
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<p>1 What this paper evaluated is 2 an entire review of the 3 literature. So it provides a 4 synthesis of those gaps and 5 limitations.</p> <p>6 BY MR. O'CONNOR:</p> <p>7 Q. Okay. And this study was 8 in -- was published in 2017, correct?</p> <p>9 A. Yes, it was published in 10 2017.</p> <p>11 Q. If you go back to 12 Exhibit 18, which is the Hadland article.</p> <p>13 A. Oh sorry. This is the 14 Hadland.</p> <p>15 MS. RELKIN: One of the 16 Hadland.</p> <p>17 BY MR. O'CONNOR:</p> <p>18 Q. One of the Hadland articles. 19 The one that we looked at earlier. This 20 was published in June of 2018, the next 21 year, correct?</p> <p>22 A. Both of these, yes. It was 23 published in 2018.</p> <p>24 Q. And at this point, at least</p>	<p>1 Q. In connection with preparing 2 your report, did you examine what factors 3 influence physicians' prescribing 4 decisions?</p> <p>5 MS. RELKIN: Objection.</p> <p>6 THE WITNESS: Did I examine 7 what factors influence physicians' 8 prescribing decisions? I believe 9 I've cited a number of studies 10 with respect to that question in 11 this report.</p> <p>12 BY MR. O'CONNOR:</p> <p>13 Q. Which studies are those?</p> <p>14 A. The studies that are in 15 front of you are among them.</p> <p>16 Q. Any others come to mind that 17 go to that point?</p> <p>18 A. Yeah, there are a number of 19 studies that are in Section B.2 that also 20 evaluate different aspects of -- again, I 21 look at aggregate level data. And so 22 there are a number of studies in B.2 that 23 look at different risk metrics for how 24 physicians prescribe.</p>

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<p style="text-align: right;">Page 478</p> <p>1 Q. Fair to say you didn't</p> <p>2 consider any studies outside of the ones</p> <p>3 cited in your report, correct?</p> <p>4 A. I believe you've been</p> <p>5 provided with all the material that I</p> <p>6 evaluated to make my opinions.</p> <p>7 Q. Okay. In considering -- or</p> <p>8 in writing your report, did you consider</p> <p>9 whether -- what physicians learn in</p> <p>10 medical school impacts their prescribing</p> <p>11 decision with respect to opioids?</p> <p>12 A. Where physicians were in</p> <p>13 medical school or what --</p> <p>14 Q. Did you consider whether</p> <p>15 what physicians learned in medical school</p> <p>16 impacted their decisions to write</p> <p>17 opioids?</p> <p>18 A. So I do epidemiological</p> <p>19 literature review and data analysis. It</p> <p>20 is at a population level. And the</p> <p>21 population level data indicates that</p> <p>22 often what physicians were told, they</p> <p>23 were misinformed about the risks and</p> <p>24 benefits of opioids.</p>	<p style="text-align: right;">Page 480</p> <p>1 BY MR. O'CONNOR:</p> <p>2 Q. Well, did you consider the</p> <p>3 extent to which whether a prescription is</p> <p>4 covered by an insurance company would</p> <p>5 affect a physician's prescribing</p> <p>6 decisions?</p> <p>7 A. Again, I'm looking at</p> <p>8 aggregate data with respect to individual</p> <p>9 level and population level factors that</p> <p>10 influence variation and risk. So whether</p> <p>11 or not a prescription is covered by an</p> <p>12 insurance company, whether that affects</p> <p>13 the physician's decision is going to be</p> <p>14 dependent on a lot of factors. And</p> <p>15 doesn't change what's in the published</p> <p>16 literature regarding the misinformation</p> <p>17 on the risks of opioids.</p> <p>18 Q. And that literature you're</p> <p>19 referring to doesn't take into account</p> <p>20 the question of formulary coverage, does</p> <p>21 it?</p> <p>22 A. Your question is whether</p> <p>23 every single one of these papers takes</p> <p>24 into account the question of formulary</p>
<p style="text-align: right;">Page 479</p> <p>1 Q. And were they -- who were</p> <p>2 they told by?</p> <p>3 A. The available literature</p> <p>4 that I have cited in this report points</p> <p>5 to materials that were received by the</p> <p>6 manufacturers.</p> <p>7 Q. Okay. And so in forming</p> <p>8 your opinion, you didn't consider what</p> <p>9 physicians learned in medical school, did</p> <p>10 you?</p> <p>11 A. People that teach in medical</p> <p>12 school are also physicians. So they</p> <p>13 are -- they are not developing their --</p> <p>14 what they teach de novo.</p> <p>15 Q. And in forming your opinion,</p> <p>16 you didn't consider whether formularies</p> <p>17 or third-party payor guidelines could</p> <p>18 affect physicians' prescribing decisions,</p> <p>19 did you?</p> <p>20 MS. RELKIN: Objection to</p> <p>21 form.</p> <p>22 THE WITNESS: Can you give</p> <p>23 me an example of formularies and</p> <p>24 third-party payor guidelines?</p>	<p style="text-align: right;">Page 481</p> <p>1 coverage?</p> <p>2 Q. Does any of them?</p> <p>3 A. That's a question about</p> <p>4 confounding. And so in order to evaluate</p> <p>5 whether formulary coverage is</p> <p>6 confounding, the estimates that are in</p> <p>7 this study, we would need to look at the</p> <p>8 definition of confounding, which I've</p> <p>9 provided in the report.</p> <p>10 Q. And none of those studies</p> <p>11 that are sitting in front of you address</p> <p>12 this question of whether something like</p> <p>13 formulary coverage influences prescribing</p> <p>14 decisions, correct?</p> <p>15 A. I would need to look at the</p> <p>16 studies.</p> <p>17 MR. O'CONNOR: Let's go</p> <p>18 ahead and take a break.</p> <p>19 THE VIDEOGRAPHER: The time</p> <p>20 is 5:47 p.m. Off the record.</p> <p>21 (Short break.)</p> <p>22 THE VIDEOGRAPHER: We are</p> <p>23 back on the record. The time is</p> <p>24 5:53 p.m.</p>

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<p style="text-align: right;">Page 482</p> <p>1 BY MR. O'CONNOR:</p> <p>2 Q. Professor Keyes, I'm going</p> <p>3 to direct you to Page 20 of your report.</p> <p>4 In the first sentence of the last</p> <p>5 paragraph, it says, "There have been</p> <p>6 rapid increases in opioid overdose death</p> <p>7 due to heroin and synthetic opioids."</p> <p>8 When you say synthetic</p> <p>9 opioids, does that include fentanyl?</p> <p>10 A. Yes.</p> <p>11 Q. And when you talk about</p> <p>12 fentanyl in your report, does that mean</p> <p>13 legally manufactured fentanyl or</p> <p>14 illegally manufactured fentanyl?</p> <p>15 MS. RELKIN: Objection to</p> <p>16 form.</p> <p>17 THE WITNESS: So the</p> <p>18 specific data that I cite is</p> <p>19 regarding the overdose deaths</p> <p>20 based on the T codes. And I don't</p> <p>21 think there's a separation between</p> <p>22 illegal and legal.</p> <p>23 BY MR. O'CONNOR:</p> <p>24 Q. So when we see fentanyl in</p>	<p style="text-align: right;">Page 484</p> <p>1 context of that one article, are you</p> <p>2 familiar with the proportion of deaths</p> <p>3 that are attributable to illegally</p> <p>4 manufactured fentanyl?</p> <p>5 A. The available data on opioid</p> <p>6 overdose deaths in the United States are</p> <p>7 largely drawn from the National Vital</p> <p>8 Statistics Service, which provides the</p> <p>9 most reliable information on death</p> <p>10 certificates and does not designate</p> <p>11 between those two.</p> <p>12 Q. And so there is no way from</p> <p>13 that information to distinguish between</p> <p>14 legally made and illegally made fentanyl,</p> <p>15 correct?</p> <p>16 A. Not based on the death</p> <p>17 records, no.</p> <p>18 MR. O'CONNOR: All right.</p> <p>19 That's all I have.</p> <p>20 But for the reasons my</p> <p>21 colleague stated earlier, we're</p> <p>22 reserving our right to keep this</p> <p>23 deposition open and to continue it</p> <p>24 or move to strike the witness</p>
<p style="text-align: right;">Page 483</p> <p>1 the report, it's not distinguishing</p> <p>2 between legally manufactured fentanyl and</p> <p>3 illegally manufactured fentanyl?</p> <p>4 A. It depends on the statement.</p> <p>5 I don't want to make a blanket statement</p> <p>6 about the report.</p> <p>7 Q. With respect to opioid</p> <p>8 overdose deaths, as you sit here today,</p> <p>9 do you know which proportion of those</p> <p>10 that involve fentanyl involved illicitly</p> <p>11 made fentanyl versus legally manufactured</p> <p>12 fentanyl?</p> <p>13 A. So you're asking a question</p> <p>14 about Reference 64 I believe. And</p> <p>15 Reference 64 -- let me check my source --</p> <p>16 is, yes, the Hedegaard -- the CDC report</p> <p>17 on drug overdose deaths in the United</p> <p>18 States from 1999 to 2017. Those data</p> <p>19 report the -- the T codes that are</p> <p>20 designated on the death certificate for</p> <p>21 each death. And those do not separate</p> <p>22 out illegal from legal.</p> <p>23 Q. And with respect to opioid</p> <p>24 overdose deaths generally, outside the</p>	<p style="text-align: right;">Page 485</p> <p>1 because of our inability to ask</p> <p>2 other questions we wanted to,</p> <p>3 given the answers the witness</p> <p>4 provided today.</p> <p>5 MS. DO AMARAL: You have two</p> <p>6 minutes. If you've got any</p> <p>7 questions, ask them now.</p> <p>8 MR. CIACCIO: If you have</p> <p>9 any questions, ask it, you have</p> <p>10 two minutes.</p> <p>11 MR. O'CONNOR: I'll ask two</p> <p>12 minutes of questions.</p> <p>13 BY MR. O'CONNOR:</p> <p>14 Q. So are you familiar with</p> <p>15 generic opioids?</p> <p>16 A. What do you mean by</p> <p>17 familiar?</p> <p>18 Q. Do you know the difference</p> <p>19 between branded opioids and generic</p> <p>20 opioids?</p> <p>21 A. The -- the literature that I</p> <p>22 assessed in this report is on the overall</p> <p>23 opioid epidemic. When there was a</p> <p>24 specific opioid that was mentioned in</p>

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<p>1 that literature, I -- I've cited it in</p> <p>2 this report.</p> <p>3 Q. Do you know that generic</p> <p>4 opioids aren't promoted to doctors in the</p> <p>5 same way that branded opioids are?</p> <p>6 A. I would need to see the</p> <p>7 documentation. That's not something that</p> <p>8 was covered in my report. So I would not</p> <p>9 agree with the statement that I had not</p> <p>10 evaluated the literature on.</p> <p>11 Q. Well, if that statement were</p> <p>12 true, would it change your opinions about</p> <p>13 whether manufacturers of those products</p> <p>14 contributed to opioid prescribing?</p> <p>15 MS. RELKIN: Objection to</p> <p>16 form.</p> <p>17 THE WITNESS: I -- what I</p> <p>18 did in this report is an overview</p> <p>19 of the literature on what is known</p> <p>20 about the emergence of the opioid</p> <p>21 epidemic. I would always keep an</p> <p>22 open mind to new information. But</p> <p>23 you have not given me any</p> <p>24 information with which to evaluate</p>	<p>1 BY MR. O'CONNOR:</p> <p>2 Q. And I understand you don't</p> <p>3 agree with the assumption. But I'm</p> <p>4 saying, if you learned that new</p> <p>5 information you say you're open to and</p> <p>6 what I said was correct, does that change</p> <p>7 your opinion?</p> <p>8 MS. RELKIN: Objection to</p> <p>9 form.</p> <p>10 THE WITNESS: I haven't</p> <p>11 learned any new information.</p> <p>12 MR. CIACCIO: That's two</p> <p>13 minutes.</p> <p>14 MR. O'CONNOR: Okay. For</p> <p>15 all the reasons we already talked</p> <p>16 about, we reserve our rights.</p> <p>17 Thank you. Thank you for your</p> <p>18 time.</p> <p>19 MS. RELKIN: No questions.</p> <p>20 THE VIDEOGRAPHER: Off the</p> <p>21 record. Okay. The time is</p> <p>22 5:58 p.m. Going off the record.</p> <p>23 MR. REATEGUE: Bruno</p> <p>24 Reategue, for the Teva defendants,</p>
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<p>1 whether my mind would be changed</p> <p>2 or not based on that information.</p> <p>3 BY MR. O'CONNOR:</p> <p>4 Q. Well, I'm asking you to</p> <p>5 assume that a particular product was not</p> <p>6 promoted to physicians.</p> <p>7 A. That's -- the -- that</p> <p>8 assumption is not what happened. So I</p> <p>9 evaluated what happened.</p> <p>10 Q. Well, I think you said a</p> <p>11 moment ago you were open to learning new</p> <p>12 information. And I -- I'm saying, if you</p> <p>13 learned that a particular product was not</p> <p>14 promoted to doctors, would that change</p> <p>15 your opinion?</p> <p>16 MS. RELKIN: Objection.</p> <p>17 THE WITNESS: I -- I am not</p> <p>18 agreeing with that assumption,</p> <p>19 based on the literature that I</p> <p>20 reviewed, and the literature that</p> <p>21 is cited in this report. I don't</p> <p>22 have any evidence with which to</p> <p>23 agree with that assumption and the</p> <p>24 premise of the question.</p>	<p>1 I'd like to put a due process</p> <p>2 violation on the record for not</p> <p>3 being able to ask questions in a</p> <p>4 meaningful way. Thank you.</p> <p>5 (Excused.)</p> <p>6 (Deposition concluded at</p> <p>7 approximately 5:58 p.m.)</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p>

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